



Forest and Range Management
Species and Habitat Conservation
Private Lands Conservation Planning
Wildfire Preparedness and Fuels Management
Geographic Information Systems

J. Michael Castillo

2006
Hawai'i Natural Resource Services, LLC

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EXHIBIT 48

Pacific island conservation and natural resource management

Hawai'i's ecosystems are unique and provide a wide range of services that sustain the island environment and culture. Michael assists governmental agencies, private landowners, and community-based organizations in planning land use projects and implementing natural resource management programs that meet project goals, protect and sustain native ecosystems, and recover rare species.

Michael has over 16 years experience conducting terrestrial plant and animal surveys, planning and implementing endangered species recovery and forest restoration on public and private land, and conducting wildfire presuppression planning for non-profit and governmental agencies. Michael has a proven ability to work with a broad range of interests and organizations to facilitate, develop, and implement innovative and cooperative solutions to complex ecological issues.

SELECT RECENT PROJECTS

- Hawaii Forest Stewardship Plan – Kealahou Heritage Ranch, South Kona, Hawaii. Prepared a 20-year Forest Management Plan addressing forest and livestock production, native ecosystem conservation, and cultural and biological resource protection over the 11,400 acre property. July - Dec 2006
- Wildfire Fuels Management Research – Puu Anahulu Game Management Area, Hawai'i – Lead research evaluating the effects of prescribed cattle grazing, prescribed burning, aerially applied herbicide, and combinations of these treatments on reducing fountain grass fuel loads in fire-prone wildland-urban interface areas of leeward Hawaii. Jan 2003 – Aug 2006
- Wiliwili Dry Forest Restoration – Waikoloa Village, Hawai'i – Provided planning and management services to the Waikoloa Village Outdoor Circle in support of a long-term rare native tree restoration project. July 2004 – Dec 2006
- Forest Certification – South Kona, Hawai'i. HNRS serves as a member of a third party forest certification body conducting Forest Stewardship Council certification evaluations of private forestry operations. May – Dec 2005
- Terrestrial Ecological Studies – Pearl and Hermes Atoll, Northwest Hawaiian Islands. Conducted vegetation, invertebrate, and avian population studies for the US Fish and Wildlife Service within the Remote Pacific Islands National Wildlife Refuge Complex, Hawai'i. Aug 2005
- Vegetation Monitoring – Pohakuloa Training Area, Hawai'i – Conducted monitoring of 200 permanent long-term vegetation monitoring stations. Applied standardized Land Condition-Trend Analysis method to assess temporal changes in vegetation structure and composition. June – Dec 2004

- Watershed Planning – Kohala Watershed Partnership, Hawaii – Prepared Watershed Management Plan for the Kohala Mountains Watershed Partnership. Plan addresses a broad range of issues related to the protection and management of surface and groundwater resources, native biological resources, and public use over the 68,000 Ac Watershed. May 2004 – April 2005
- Wetland Ecological Systems Classification – Hawaii Natural Heritage Program, Oahu – Prepared Ecological Systems Classification of Hawaii isolated and non-isolated wetlands in support of a national GAP-Analysis Ecological Systems classification being conducted by NatureServe. Dec 2003 – Apr 2004
- Biological Inventory – North Kona District, Hawaii – Conducted avifaunal and floristic inventory of privately owned 40 acre parcel in Kaloko subdivision. June – Sept 2003
- Endangered Species Recovery – South Kona District, Hawaii – Coordinated planting of 3 populations of the endangered fan palm (*Pritchardia schattaueri*) on private and state land using Youth Conservation Corps interns. Cooperators included the Nature Conservancy of Hawaii, Ho'omau Ranch, and the Amy B.H. Greenwell Ethnobotanical Garden. Aug 2003
- Forest Restoration Planning – Hamakua district, Hawai'i – Developed Forest Restoration Plan for 36 acres of private montane wet forest to meet County requirement for Native Forest Dedication property tax classification. July 2003

Specialized Skills and Abilities

Species inventory and survey, ecological community mapping, population and habitat monitoring, and related studies of terrestrial and freshwater systems.

Conservation planning for landowners, conservation grant writing, Hawai'i County property tax code and State conservation program compliance, and federal and state endangered species and environmental regulatory compliance.

Forest certification, silviculture, forest management planning, plantation maintenance, and tree planting.

Invasive and alien species management, biological inventory, mapping, interdiction, eradication, and integrated control of insect, plant, and mammalian pests.

Wildfire management and research, proactive preparedness planning, fuels management, wildfire presuppression planning, prevention, education, and spatial fire behavior modeling.

Information technology, modeling, and data analysis, proficiency with Geographic Information Systems (GIS), global positioning systems (GPS), remote sensing, wildfire behavior and species population models, statistical analysis, and experimental design.

EDUCATION

- MS Forest Ecosystem Management**
College of Forestry and Natural Resource Management, Colorado State University, 1997
- Thesis** Control of *Pennisetum setaceum* (Forssk.) Chiov. in Montane Dry Forest Ecosystems, Hawaii.
- BS Forestry – Forest Biology Concentration**
College of Forestry and Natural Resource Management, Colorado State University, 1994

PROFESSIONAL EXPERIENCE

- Hawaii Natural Resource Services, LLC, Hilo, Hawaii – Principal Consultant. Provide a range of consulting and management services related to the protection and sustainable use of Hawai'i's terrestrial ecosystems, including watershed conservation planning, invasive species management, forestry, wildfire preparedness planning, and species survey and monitoring. 2003 – present
- West Hawaii Wildfire Management Organization^{501(c)(3)}, Kamuela, Hawaii – President/Chairman. Manage non-profit corporation to provide technical and financial assistance, conduct education, and develop and implement wildfire fuels reduction measures to protect native ecosystems and communities in West Hawaii. 2000 – present
- U.S. Fish and Wildlife Service, Hilo, Hawaii – Biologist. Conducted endangered species recovery planning and implementation, private landowner project development, and wildfire management planning. 2001 – 2003
- U.S. Fish and Wildlife Service, Honolulu, Hawaii – Biologist. Conducted federal project impact evaluation, and endangered species recovery planning and implementation. 1997 – 2001
- Colorado State University, Fort Collins, Colorado – Research Associate. Conducted ecological research in control of fountain grass, effects of wildfire on vegetation, and vegetation mapping at the US Army Pohakuloa Training Area, Hawai'i. 1994 – 1997

Colorado State University, Fort Collins, Colorado – Research Assistant. 1990 – 1994
Conducted rare plant survey, vegetation monitoring, and vegetation mapping at the US Army Pohakuloa Training Area, Hawai'i.

USDA Forest Service, Ennis, Montana – Forestry and Recreation Tech. 1989 – 1992
Conducted wildlife habitat enhancement and trail construction and maintenance.

RELEVANT PROJECT EXPERIENCE

Hawaii Natural Resource Services, LLC, Kamuela, Hawaii – Consultant 2003 – 2005

Forest Certification—Honaunau Forest, Hawai'i – Serve as a member of the 3-person Forest Stewardship Certification audit team that conducted an evaluation of planned private forestry operation and awarded International Forest Stewardship Certification in 2005.

Interagency Wildfire Research – North Kona District, Hawaii – Lead investigator and project manager of the Puu Anahulu Wildfire Management Study, an interagency research project that is developing wildfire fuels reduction techniques for use along roadside in leeward Hawaii. Research funding was provided by the national Joint Fire Science Program and U.S. Fish and Wildlife Service, with involvement and support from state and local agencies and organizations.

Vegetation Monitoring – Pohakuloa Training Area, Hawaii – Conducted 2004 vegetation monitoring (5-year cycle) of 190 permanent long-term monitoring stations on US Army training lands at Pohakuloa. Sampling method applied was the Land Condition-Trend Analysis standardized method.

Ecological Survey – Pearl and Hermes Atoll, Remote Pacific Islands National Wildlife Refuge, Hawai'i – Conducted terrestrial surveys to document status and condition of flora, invertebrate fauna, and bird populations on North and Southeast Islands as part of a Damage Assessment for the grounding of the Casitas vessel. Prepared terrestrial chapter of Field Report.

Watershed Management Planning – Kohala Watershed Management Partnership, Hawaii – Prepared Watershed Management Plan for the 68,000 acre Kohala Mountains Watershed Partnership. Plan addresses a broad range of issues related to the protection and management of surface and groundwater resources, native biological resources, and public use.

Dry Forest Restoration – Waikoloa Village, Hawaii – Providing planning and forest pest management services to the Waikoloa Village Outdoor Circle in support of a long-term community-based 250-acre rare and endangered native tree habitat restoration project.

Endangered Fan Palm Recovery – South Kona District, Hawaii – Coordinated planting of 3 populations of the endangered fan palm (*Pritchardia schattaueri*) on private and state land using 2004 Youth Conservation Corps interns. Cooperators included the Nature Conservancy of Hawaii, Ho'omau Ranch, and the Amy B.H. Greenwell Ethnobotanical Garden.

Forest Restoration Plan – Hamakua district, Hawaii – Developed Forest Restoration Plan for 36 acres of private montane wet forest to meet County requirement for Native Forest Dedication property tax classification.

Biological Inventory – North Kona District, Hawaii – Conducted avifaunal and floristic inventory of privately owned 40 acre parcel in Kaloko subdivision.

Wetland Ecological Systems Classification – Hawaii Natural Heritage Program, Oahu – Prepared Ecological Systems Classification of Hawaii isolated and non-isolated wetlands in support of a national GAP-Analysis Ecological Systems classification being conducted by NatureServe.

U.S. Fish and Wildlife Service – Hilo, Hawaii –Biologist

2001-2003

Loulu fan palm (*Pritchardia schattaueri*) recovery partnership – South Kona, Hawaii – Developed and coordinated interim recovery efforts for the federally endangered *Pritchardia schattaueri* plant. Measures included assessment of mammalian and weed threats, habitat management, and seed collection and propagation. Partners included the Ho'omau Ranch, Hawaii Division of Forestry and Wildlife, USGS Biological Resource Division, Hawaii Volcanoes National Park, Hawaii Youth Conservation Corps, University of Hawaii at Hilo, Amy B.H. Greenwell Ethnobotanical Garden, Hawaii Palm Society, and the Kona Outdoor Circle.

Private land habitat restoration – Ahualoa, Hawaii – Planning and guidance to private landowner in the restoration of 7.5 acres of lowland wet forest to serve as habitat for 4 endangered plant species.

U.S. Fish and Wildlife Service – Honolulu, Hawaii – Biologist

1997-2003

Biological monitoring -- Islands of Sarigan and Anatahan, Commonwealth of the Northern Mariana Islands – Conducted vegetation monitoring one year following removal of feral goats and pigs (Serigan). Analyzed data against results from previous data and prepared report establishing baseline vegetation.

Plant Habitat Restoration Strategy -- Kauai National Wildlife Refuge Complex, Kauai – Developed plan to restore approximately 50 acres of native lowland and coastal plant communities to each of three National Wildlife Refuges.

Project liaison, Kokee Resource Conservation Program -- Kokee, Kauai – Served as project liaison to a community-based volunteer invasive plant management

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program in Kokee and Waimea Canyon State Parks and adjacent lands. Managed administration of project funding, acquisition of equipment, and review of reports for program from 1998-2001.

Ecosystem restoration plan -- Waihiawa Bog, Kauai -- Developed draft ecosystem protection and restoration plan for privately owned Kanaele bog and surrounding Waihiawa drainage basin.

Colorado State University, Center for Ecological Management of Military Lands, Fort Collins, Colorado -- Research Associate 1990-1997

Rare and endangered plant survey -- Puu Anahulu Game Management Area, Hawai'i -- Conducted coarse-scale rare plant survey over 20,000 acre Puu Anahulu Game Management Area to identify and locate rare dry forest species, identify condition of dry forest between 2,000 and 5,000 ft. elevation, and map remaining forest communities important for conservation.

Rare and endangered plant survey -- Pohakuloa Training Area, Hawaii -- Supervised field crews of 2-5 conducting rare and endangered plant species surveys over the 110,000 acre installation. Included work in remote locations.

Vegetation monitoring -- Pohakuloa Training Area, Hawaii -- Conducted long-term vegetation monitoring applying US Army LCTA methods. Supervised the installation of 50 new permanent plots in underrepresented vegetation types and assisted in the monitoring of additional LCTA and specialized research plots to monitor vegetation and rare plant habitat.

Vegetation mapping -- Pohakuloa Training Area, Hawaii -- Mapped vegetation of installation using black and white and color infra-red aerial photographs. Applied map accuracy analysis process to further refine accuracy.

USDA Forest Service, Madison Ranger District, Beaverhead National Forest, Montana -- Forestry and Recreation Technician (GS 3/4/5) 1989-1992

Wildlife Habitat Enhancement -- Beaverhead National Forest -- Conducted cutting of stunted and diseased aspen (*Populus tremuloides*) stands to trigger stand regeneration and create deer and elk foraging and resting habitat.

Trail Construction and Maintenance -- Beaverhead National Forest -- Supervised field crews in the construction of new foot and horse trail within National Forest (including a section of the Continental Divide Trail), and trail maintenance and bridge replacement along existing trails within the Lee Metcalf Wilderness Area.

BOARDS, COMMITTEES, AND SERVICE

Member, Mauna Kea Soil and Water Conservation District	
Waiulaula Watershed Advisory Committee	2005-2006
Board of Directors, Hawaii Dry Forest Working Group	2005-2006
Member, UH Hilo / HCC Forest Team Advisory Board	2004-2006
President, West Hawai'i Wildfire Management Organization 501(c)(3)	2002-2006
Member, Society for Range Management	2003-2006
Member, Pu'u Wa'awa'a Ahupua'a Advisory Council	2002-2005
Member, North Kona Dry Forest Working Group	1997-2006

PUBLICATIONS AND TECHNICAL REPORTS

- Castillo M., Weise D., Nakahara M., Enriquez G., Vihnanek R., McAdams A., Ford, and Moraga R. 2006. Effects of Grazing, Burning and Herbicide on Fountain Grass Fuel Beds in Hawaii. In: Proceedings: 3rd International Fire Ecology and Management Congress, November 13-17, San Diego, CA.
- Castillo, J.M., A. McAdams, M. Nakahara, D. Weise, and G. Enriquez. 2006. Effects of Prescribed Grazing and Burning Treatments on Fire Regimes in Alien Grass-dominated Wildland-Urban Interface Areas, Leeward Hawaii. Final Report to the Joint Fire Science Program, Boise, ID. 3 August. 94 p.
- Castillo, M. G. Enriquez, M. Nakahara, D. Weise, L. Ford, R. Moraga, and R. Vihnanek. In Press. Effects of Grazing, Herbicides, and Prescribed Burning, on Fountain Grass Fuel Loading in Hawai'i. Proceedings: 23rd Tall Timbers Fire Ecology Conference, Fire in Grasslands and Shrublands. Bartlesville, OK. 25 p.
- Delay, J. M. Merlin, J. Juvik, M. Castillo, and L. Perry. 2005. Field Guide to Rare and Unusual Plants on the Island of Hawai'i. Hilo Bay Printing, Co., Hilo, HI. 32 p.
- Cordell, S.; Sandquist, D.R.; Litton, C.; Cabin, R.J.; Thaxton, J.; Hadway, L.; Castillo, J.M.; Bishaw, D. 2004. An invasive grass has significant impacts on tropical dry forest ecosystems in Hawaii: The role of science in landscape level resource management and native forest restoration in West Hawaii. In: Proceedings of the Society for Ecological Restoration annual meeting, 2004 August 24-27; Victoria, Canada.
- Shaw, R.B. and J.M. Castillo. 1997. Plant Communities of Pohakuloa Training Area, Hawaii. Center for Ecological Management of Military Lands, Fort Collins. 118 p.
- Castillo, J. M. 1997. Control of *Pennisetum setaceum* (Forssk.) Chiov. in Montane Dry Forest Ecosystems, Hawaii. MS Thesis, Colorado State University, Fort Collins. 41 p.

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Castillo, J.M., T. Tierney, and R.B. Shaw. 1997. Plant Community Types of Pohakuloa Training Area, Hawai'i. Center for Ecological Management of Military Lands, Colorado State University, Fort Collins. Map, scale: 1:30,000.

Shaw, R. B., J. M. Castillo, and R. D. Laven. 1995. Impact of Wildfire on Vegetation and Rare Plants within the Kipuka Kalawamauna Endangered Plants Habitat Area, Pohakuloa Training Area, Hawaii. Proceedings – Fire Effects on Rare and Endangered Species and Habitats Conference, Nov. 13-16, 1995. Cour d'Alene, Idaho. P. 235 – 264.

Shaw, R.B., P.P. Douglas, J.M. Castillo, T.A. Tierney, and E.L. Painter. 1993. Assessment of the Status and Recovery of Rare Plants in the Multipurpose Range Complex, Pohakuloa Training Area, Hawai'i; Phase II, Complete Survey. CEMML Report 92-3.

RELEVANT TRAINING

Learning to Lead Collaboratively – 2005

Endangered Species Recovery Implementation – 2002

Interagency Section 7 Consultation - 2002

Scientific methods and principles in endangered species conservation - 2002

Measuring and Monitoring Plants and Vegetation – 1999

Endangered Species Recovery Planning – 1998

Helicopter Dunker – 1998, 2002

Basic Aircraft Safety - 1997, 2002

Emergency Medical Technician, Basic -- 1988